

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/24556

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B66B 1/20
 US CL : 187/ 383, 388, 389, 380

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 187/ 383, 388, 389, 380

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,092,430 A (GOTO et al) 03 March 1992 (03.03.1992), see figure 1.	1-20
A	US 5,719,360 A (DAVIS et al) 17 February 1998 (17.02.1998), see figures 2-4.	1-20
A	US 5,831,226 A (HATTORI et al) 03 November 1998 (03.11.1998), see entire document.	1-20
A	US 5,969,304 A (BARKER et al) 19 October 1999 (19.10.1999), see figure 1.	1-20
A	US 6,601,678 B2 (KOSTKA et al) 05 August 2003 (05.08.2003), see entire document.	1-20

 Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"E" earlier application or patent published on or after the international filing date

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"O" document referring to an oral disclosure, use, exhibition or other means

"&"

document member of the same patent family

"P" document published prior to the international filing date but later than the priority date claimed

Date of the actual completion of the international search
 02 January 2004 (02.01.2004)

Date of mailing of the international search report

13 FEB 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Jonathan Salata

Telephone No. 703-308-0956

Naava Chasman
for